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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/700,833	06/07/2001	Olaf Duebel	11150/29	2893
26646	7590	10/14/2004	EXAMINER	
KENYON & KENYON ONE BROADWAY NEW YORK, NY 10004			CREPEAU, JONATHAN	
			ART UNIT	PAPER NUMBER
			1746	

DATE MAILED: 10/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/700,833

Applicant(s)

DUEBEL ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed, after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 July 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 32-40 is/are allowed.
- 6) ☒ Claim(s) 17-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 17-40. Applicant's amendments have overcome all rejections over the Grot et al. reference. However, claims 17-31 remain rejected for substantially the reasons of record over Kawatsu et al. Claims 32-40 are allowed. Accordingly, this action is made final.

Oath/Declaration

2. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

Non-initialed and/or non-dated alterations have been made to the oath or declaration (in particular to inventor Jessica Reinkingh's address). See 37 CFR 1.52(c).

Claim Rejections - 35 USC § 102

3. Claims 17, 19, 30, 31, and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by Kawatsu et al (U.S. Patent 6,120,925).

Regarding claim 17, the reference is directed to a fuel cell system comprising a reformer unit (32), a fuel cell unit (20), and a CO selective oxidation device (34) disposed between the reformer unit and the fuel cell unit (see Fig. 1). As shown in Figures 7 and 8 and described in column 14, line 46 et seq., a water injection device (80) is disposed at the oxidation device and is configured to inject water therein. Regarding claims 19 and 30, the material to be reformed is liquid methanol (see col. 10, line 44). Regarding claims 17 and 41, the injected water is capable of oxidizing CO into CO₂.

Thus, the instant claims are anticipated.

Claim Rejections - 35 USC § 103

4. Claims 17, 22-25, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buswell et al (U.S. Patent 5,630,679) in view of Kawatsu et al.

Regarding claims 17 and 28, Buswell et al. is directed to a fuel cell system comprising a reformer unit (168), a fuel cell unit (186), and a CO selective oxidation device (142) disposed between the reformer unit and the fuel cell unit (see Fig. 1). Regarding claim 30, the raw material is a hydrogen-containing material such as natural gas (see col. 7, line 38). Regarding claims 22, 28, and 29, the system comprises a two-stage compressor (130, 134) configured to supply compressed air to a cathode of the fuel cell unit (see col. 6, line 50 et seq.). Regarding claim 28, expanders are disposed in the cathode exhaust stream and are connected to the compressors via common shafts (see Fig. 1). Regarding claims 23 and 24, the system comprises

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water separators (i.e., condensers) (188, 189) disposed in the cathode and anode exhaust streams.

The separated water is supplied to a point upstream of the reformer (see col. 8, lines 12-16).

Regarding claim 25, a water circulation loop (42, 43) is configured to cool the fuel cell (see Fig. 1).

Buswell et al. do not expressly teach that the selective oxidation unit comprises a water injection device, as recited in claims 17 and 28.

As set forth above, Kawatsu et al. teach a selective oxidation unit comprising a water injection device.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the selective oxidation unit of Kawatsu et al. in the system of Buswell et al. In the abstract, Kawatsu et al. teach the injection of water into their oxidation unit "enhances the cooling efficiency and enables all the selective CO oxidizing catalysts 50 stored in the selective CO oxidizing unit 34 to be maintained in the active temperature range, thus sufficiently reducing the concentration of carbon monoxide included in a resulting gaseous fuel." Accordingly, the artisan would be motivated to use the selective oxidation unit including the water injection device of Kawatsu et al. in the system of Buswell et al.

5. Claims 17-21, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Negishi (U.S. Patent 6,165,633) in view of Kawatsu et al.

Regarding claims 17, 18, and 20, Negishi is directed to a fuel cell system comprising a reformer unit (31), a fuel cell unit (40), and a CO selective oxidation device (26) disposed between the reformer unit and the fuel cell unit (see Fig. 1). Regarding claims 19, 30, and 31, the material to be reformed is liquid methanol (see col. 12, line 2). Regarding claim 18, the system includes a drive system of a motor vehicle (see col. 10, line 62). Regarding claims 20 and 21, the reformer includes a mixer configured to mix the methanol and an oxygen-containing substance (e.g., air) (see Fig. 1; col. 17, line 38 et seq.).

Negishi do not expressly teach that the selective oxidation unit comprises a water injection device, as recited in claims 17, 20, and 28.

As set forth above, Kawatsu et al. teach a selective oxidation unit comprising a water injection device.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the selective oxidation unit of Kawatsu et al. in the system of Negishi. In the abstract, Kawatsu et al. teach the injection of water into their oxidation unit “enhances the cooling efficiency and enables all the selective CO oxidizing catalysts 50 stored in the selective CO oxidizing unit 34 to be maintained in the active temperature range, thus sufficiently reducing the concentration of carbon monoxide included in a resulting gaseous fuel.” Accordingly, the artisan would be motivated to use the selective oxidation unit including the water injection device of Kawatsu et al. in the system of Negishi.

6. Claims 17-19, 26, 27, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pettit (U.S. Patent 6,077,620) in view of Kawatsu et al.

Regarding claims 17, 18, and 26, Pettit is directed to a fuel cell system comprising a reformer unit (2), a fuel cell unit (16), and a CO selective oxidation device (14) disposed between the reformer unit and the fuel cell unit (see Fig. 1). Regarding claims 19, 30, and 31, the material to be reformed is liquid methanol (see Figure 1). Regarding claim 18, the system includes a drive system of a motor vehicle (see col. 1, line 44; col. 3, line 52). Regarding claim 26, a catalytic burner (28) is configured to combust exhaust gas (20) from the anode and to direct waste heat to the reformer via line 32 (see Fig. 1). Regarding claim 27, the burner is connected to a supply tank for supplying raw methanol (50) (see Fig. 1).

Pettit does not expressly teach that the selective oxidation unit comprises a water injection device, as recited in claims 17, 18, and 26.

As set forth above, Kawatsu et al. teach a selective oxidation unit comprising a water injection device.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the selective oxidation unit of Kawatsu et al. in the system of Pettit. In the abstract, Kawatsu et al. teach the injection of water into their oxidation unit "enhances the cooling efficiency and enables all the selective CO oxidizing catalysts 50 stored in the selective CO oxidizing unit 34 to be maintained in the active temperature range, thus sufficiently reducing the concentration of carbon monoxide included in a resulting gaseous fuel." Accordingly, the artisan would be

motivated to use the selective oxidation unit including the water injection device of Kawatsu et al. in the system of Pettit.

Response to Arguments

7. Applicant's arguments filed July 12, 2004 have been fully considered but they are not persuasive insofar as they apply to the present rejections. Applicants state that the claims recite that the structure of the oxidation device is such that it is configured to convert carbon monoxide by a reaction with oxygen supplied by injected water, which Kawatsu does not disclose or suggest. However, it is submitted that the structure of the oxidation device of Kawatsu is such that it is at least *capable* of performing the claimed oxidation by the reaction of water (i.e., a water-shift reaction). In column 15, line 50, Kawatsu discloses the following regarding the catalyst of the oxidation device:

In the first embodiment discussed above, the selective CO oxidizing catalysts 50 include an aluminum oxide carrier with the platinum catalyst carried thereon. Other available carriers include silicon oxides, zirconium oxides, cerium oxide, zinc oxide, calcium carbonate, copper oxides, iron oxides, titanium oxides, cobalt oxides, and yttria-partially-stabilized zirconia. Other available catalysts carried on the carrier include rare metals, such as Pd, Ru, Rh, Ir, and Au, and non-rare metals, such as Ni, Co, Cu, and Fe.

Thus, Kawatsu teaches a plurality of catalyst species, with platinum on alumina being preferred. It is submitted that these catalyst species are at least *capable* of catalyzing a water shift reaction, as evidenced by Silver, U.S. Pat. 6,455,182 (noble metal on ceria/zirconia) and EP 116191 (Pt on zirconia/alumina, etc.). As such, because the Kawatsu apparatus employs catalysts substantially identical to those of Silver and EP '191, it is submitted that the Kawatsu catalyst would thus be

capable of catalyzing a water shift reaction, as recited in the claims. As such, claims 17-31 are still not seen to be structurally distinguishable over Kawatsu.

Allowable Subject Matter

8. Claims 32-40 are allowed.
9. The following is an examiner's statement of reasons for allowance:

Claims 32, 33, and 38 are each directed to methods comprising the steps of injecting water to supply oxygen to oxidize carbon monoxide into carbon dioxide, and supplying a reduced amount of a supplemental oxygen containing substance. Kawatsu et al., the closest prior art, discloses the injection of water for cooling purposes, but the water does not participate in the oxidation reaction. Since it would not be obvious to change the principle of operation of Kawatsu by reacting the water in the device, claims 32-40 define allowable subject matter.

Conclusion

10. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

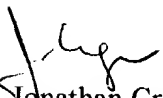
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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jonathan Crepeau
Primary Examiner
Art Unit 1746
October 13, 2004